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## Description

# MULTI-FUNCTIONAL RUNNING MACHINE AND METHOD FOR CONTROLLING THE SAME

### Technical Field

- [1] The present invention relates to a multi-functional running machine and a method for controlling the machine and more particularly to a multi-functional running machine adapted to perform various exercises such as running, walking, wrenching, stretching, stooping and so on in accordance with the condition of user's health or an exercise taste of user by allowing a running belt to be reciprocately moved at a prescribed distance and permitting user to input directly the reciprocating times, reciprocating distance and reciprocating speed of the running belt or use selectively them programmed with various combinations. The present invention also relates to a method for controlling the running belt to be reciprocately moved at a predetermined distance.

[2]

### Background Art

- [3] A running machine is an exercise tool adapted for user to gradually walk or run on a running belt which is coupled rotationally and in an endless track to a pair of rotation shafts, and the user can perform the exercise irrespective of a place.
- [4] However, in conventional running machines, a motor driving the running belt has only a function uniformly rotating clock-wisely and counter clock-wisely and thus the running belt is moved only in a forward direction or a reverse direction. Accordingly, conventional running machines have only a function allowing an exercise for forwardly walking or running or an exercise for backwardly walking or running, and resultantly problems incapable of performing various exercises.

[5]

### Disclosure of Invention

#### Technical Problem

- [6] An object of the present invention is to provide a multi-functional running machine capable of performing conventional exercises such as walking or running by controlling the reciprocating times, reciprocating distance and reciprocating speed of the running belt at a predetermined scope so as to allow a reciprocating movement to be performed as well as capable of completely performing, by the running machine, various exercises such as stretching of respective parts of a body, a muscular exercise and the like. Other object of the present invention is to provide a method for variously controlling the running belt to allow it to be reciprocately moved at a predetermined scope.

[7]

### Technical Solution

[8]

A multi-functional running machine according to the present invention is characterized in that the machine is adapted to control the reciprocating times, reciprocating distance and reciprocating speed of a running belt and thus allows user to selectively perform various exercises such as basic running and walking as well as wrenching, stretching, stooping and so on in accordance with the condition of user's health or an exercise taste of user.

[9]

In the construction of conventional running machines, a running belt 5 is wound to have an endless-track movement on two rotational shafts 6 installed to be spaced at a predetermined gap from each other, any one of the rotational shafts 6 is coupled via a belt 18 to a motor 18, and the running belt 5, the rotation shafts and the motor 13 and so on are installed inside of the lower frame 1 that serves as an external casing. Further, a support frame 2 is installed into the one side of the lower frame 1. The support frame 2 is attached with a handle 3, and on the upper portion of the running machine, installed is a scale plate 4 indicating a running speed, a running time, a calorie consumption amount and so on.

[10]

The multi-functional running machine 100 according to the present invention adapted for a running belt 5 to perform conventional functions as in the above conventional structure is characterized in that the running belt is reciprocately moved in a given scope by a separate program mode or user's input mode.

[11]

As described above, a construction for controlling the reciprocating movement of the running belt 5 comprises a sensor 9 for variously sensing actuating information including a reciprocating times, a reciprocating distance, a reciprocating speed, forwarding and reversing rotations and the like so on, and a motor driver 24 for controlling the motor 13 to allow the running belt 5 to be reciprocately moved.

[12]

According to the above construction, in estimating the moving distance of the running belt 5 due to the rotation of the motor 13, information regarding the forwarding and reversing rotations sensed by the sensor 9 and the speed and moving distance of the running belt 5 is transferred to a control unit and then the control unit directs a command to the motor driver 24 for allowing the running belt 5 to perform an exact reciprocating movement by analyzing the information in accordance with the actuating program of the running belt 5 inputted in advance. The command of the motor driver 24 allows the motor 13 to be increased or reduced in its speed, to be forwardly or reversely rotated and to be stopped, and therefore it is possible to control the running belt 5 in the running machine.

[13]

As such, the information of the running belt 5 can be obtained by measuring the

rotation speed, rotation direction and rotation times of the rotation shaft on which the running belt 5 is wound. Namely, this is because it is possible to detect the most reliable rotation speed and the like of the running belt 5 in the adjacent belt pulley 8 in the running belt 5.

[14] The above construction and method according to the present invention were adapted because in case that the rotation speed, rotation direction and rotation times are measured and calculated, the reciprocating times, reciprocating distance and the reciprocating speed of the running belt 5 cannot exactly be controlled due to a slip of a belt 18 and so on. However, in a structure designed to prevent the slip of the belt 18 and so on, it is possible to adapt a sensor recognition scheme in the belt pulley 8 in the motor 13.

[15] Accordingly, a preferred embodiment of the above sensor 9 may be consisted of a reflective plate 10 attached to the rotation shaft 6 coupled to the motor 13 and a detector 11 for making a light incident to the reflective plate 10, detecting the reflected light and determining the actuating information. Alternatively, the sensor may be variously constructed using an optical sensor as well as a sensor employing a magnetic field which is not affected with dust. Also, the sensor may be implemented by having the belt pulley 8' attached with the reflective plate 10 or a magnet.

[16] The reflective plate 10 is printed with a A image 25 and a B image 26 step-wisely to each other, and the detector 11 is a complex sensor for sensing two images and determines a forwarding and reversing rotations in accordance with the detected order of the A mirror 25 and B image 26.

[17] While the control unit's command indicating the output of the motor 13 directs a forwarding rotation and thus the running belt 5 is forwardly rotating, if the control unit directs a reverse rotation command, a very small amount of reciprocating movement may occur in a moment in the motor 13 irrespective of the control unit's command due to an over-action of physical power of exercising person and inertia. Therefore, in order to calculate a correct error of the reciprocating distance, it is desirable to increase the number of marks on the reflective plate 10, that is, the A image 25 and B image 26 to thereby reduce the scope of the error.

[18] Therefore, the motor 13 is controllably rotated in accordance with the exercise program selected by user via a scale selecting switch and thus the movement of the running belt 5 being moving by the rotation of the rotating shaft coupled via the running belt 5 to the motor 13 can appropriately control the reciprocating distance, reciprocating speed and reciprocation times based on the exercise program which was selected by the user.

[19] The present invention may be applied by various constructions and methods for safe in which a recognition table 23 is plural-formed on the lower frame 1 and the running

belt 5, respectively and in an equal interval so that user can easily identify with the naked eye the reciprocating times, reciprocating distance and reciprocating speed. Accordingly, because the recognition table formed on the lower frame 1 is fixed and the recognition table 23 indicated on the running belt 5 is moved, the user can estimate the speed, direction and distance by recognizing the relative distance while exercising. As such, the lower frame 1 having the recognition table 23 indicated thereon and the running belt 5 are shown in Figure 1.

- [20] As other safe device, a safe switch for stopping the running belt 5 is attached on the side surface of the lower frame 1 or the surface toward the running belt 5 of the support frame 2. Accordingly, it is possible to stop the running belt 5 at any time while exercising by operating the safe switch 17. The safe switch 17 can freely be positioned at any place other than the above mentioned position.
- [21] As another safe device, a lamp or speaker alarms any conversion of forwarding or reversing rotation, thereby allowing user to recognize it visually or acoustically. As such, the conversion is alarmed visually or acoustically by a kind of alarming sound or alarming light informing user that he/she is performing an exercise other than walking or running in the running machine 100 and thus the alarming function serves to improve a safe by bringing user to an awareness to physically respond at the time when the conversion of the direction of the running belt 5 was made.
- [22] In a reciprocating movement based on such safe in exercise, installed is a subsidiary handle 22 as a means for causing more various exercising attitudes. That is, the subsidiary handle 22 is detachably coupled to the support frame 2 or installed to the subsidiary frame 21 of the support frame 2 so as to be used during various exercises.
- [23] User can perform a waist stooping exercise by pulling in hand or loosening the subsidiary handle 22 made of, for example, a rope. Therefore, thanks to the subsidiary handle 22, user can perform a powerful stooping exercise and at the same time avoid an immoderate exercise by pressing or loosening his waist with the pulling of the rope without a separate input of program on the scale plate 4 during a reciprocating exercise of the running belt 5. Accordingly, it can provide user with a variability and convenience when user is performing a waist stooping exercise.
- [24] As a constitutional element for the extension of such various exercise attitudes, a subsidiary base 7 is installed. That is, the subsidiary base 7 is installed on one end of the lower frame 1 or the adjacent side thereof so that user can perform a stretching exercise or a muscular power exercise, touching it with his leg, knee or hand. The subsidiary base 7 may also be constructed to be fixedly coupled to one end of the lower frame 1. In a structure located at the bottom to be spaced in a predetermined distance without having the fixedly coupled structure, it is desirable to attach a pad to the lower bottom portion in order to prevent slipping.

- [25] Further, the running belt 5 may be attached with a detachable pad 16 to be supportedly used when performing various exercises. The pad 16 is provided for user so as to make his hands sanitary on the running belt 5, and serves to visually confirm the function of the recognition table 23 with the same reciprocating speed and distance.
- [26] The present invention having the above structure allows user to perform selectively various exercises including conventional walking and running exercises as well as a stretching exercise of legs, a muscular power exercise of abdominal muscles, a stretching exercise of the side, a stretching exercise of body, a stretching of arms and a muscular power exercise latissimus dorsi by controlling the reciprocating times, reciprocating distance and reciprocating speed of the running belt 5 to be reciprocately moved.
- [27] As such, the device for controlling the running belt 5 comprises a sensor 9 for sensing actuation information of the rotation shaft 6 and a motor driver 24 for controlling the rotation movement of the motor 13, which will be described in detail with reference to Figure 2.
- [28] Figure 2 shows as one preferred embodiment of the sensor 9 which comprises a reflective plate 10 and a detector 11. The reflective plate 10, which is a plate having two colors or different materials crossed alternately on its circumference at a given angle, may be made of materials capable of reflecting a light or used as having a pattern printed thereon in order to determine forwarding and reversing rotations. Further, the reflective plate 10 is attached to the surface of the belt pulley 8 coupled to the rotation shaft 6 of the running belt 5 and is coupled via belt 18 to a belt pulley 8' of the motor 13, and thus reflects a light with equally rotating therewith. Alternatively, the reflective plate 10 may be attached to the belt pulley 8' of the motor 13.
- [29] The detector 11 incidents a light into the reflective plate 10 and detects the reflective light to thereby determines the actuation information including the forwarding and reversing rotations and speed of the running belt 5. The detector 11 is installed on an appropriate position parallel with the reflective plate 10 with being spaced with the reflective plate 10 in a given distance. Herein, the detector 11 is preferably tightly fixed to the lower frame 1.
- [30] Accordingly, the sensor 9 detects actuation information of the rotation shaft 6 coupled via the belt 18 to the motor 13, wherein since the rotation shaft 6 is wound and rotationally moved with the running belt 5 at an endless track, it is possible to detect the reciprocating times, reciprocating distance and reciprocating speed of the running belt 5 from the actuation information of the rotation shaft 6.
- [31] As such, the movement information of the running belt 5 detected by the sensor 9 is inputted to a control device for controlling the rotation of the motor 13 and the control device controls the motor 13 by comparing the rotation direction, rotation speed and

rotation times of the motor 13 which are determined in advance in accordance with running or stretching exercise program selected by user with the actuation information of the motor 13 being inputted from the sensor 9 to thereby allow the exercise program to be correctly performed.

[32] The motor driver 24 additionally attached to the present invention functions to perform the conversion of the forward or reverse of motor 13 and stop the motor 13 for several seconds. Herein, the several seconds may be three to four seconds and are set as the time for increasing a stress of leg or waist long-stretched by the user's stretching exercise.

[33] Accordingly, the motor 13 is rotated with the control of the rotation direction, rotation speed and rotation times thereof by the control device and the motor driver 24 in accordance with the exercise program selected by user via a selecting switch of the scale plate 4 in the running machine 100 and thus the movement of the running belt 5 being moved with the rotation of the rotation shaft 6 coupled via the belt 18 to the motor 13 can be controlled appropriately in accordance with the exercise program selected by the user.

[34] That is, when performing general walking and running exercise, the motor 13 is rotated in a predetermined direction and speed, while when performing stretching or muscular power exercise including leg exercise, abdominal muscles exercise, waist exercise and body exercise, the motor 13 is rotated with changing the rotation direction at a predetermined time interval to allow the running belt 5 to be reciprocately moved.

[35] As such, the invention which is directed to a method for controlling the running belt 5 of the running machine 100 is characterized by calculating the reciprocating times, reciprocating distance and reciprocating speed of the running belt 5 using the rotation times and rotation speed of the rotation shaft having the running belt 5 wound thereon. Accordingly, it is possible to control the reciprocating movement of the running belt 5 more correctly. Of course, it may be possible to control it by detecting the reciprocating times, reciprocating distance and reciprocating speed and comparing them with that set in advance. Further, as a control method for safe, when the running belt 5 is forwardly or reversely rotated, it may be configured for the running belt 5 to be stopped if it is moved above the set time in any one direction. That is, when a time that calculated the distance and speed in any one direction is over, the running belt 5 is stopped by estimating the error time on the program. This error time is applied as a time that reaches from the scale plate 4 to any side portion of the reciprocating running belt due to the sensor's malfunction or other unclear error and thus the running belt 5 is prevented from consistently moved in only one direction to thereby protect user from a dangerous situation.

[36] Herein, the error time is set by adding a given redundant time to the settled

reachable time of the running belt 5. The redundant time is an appropriate time to prevent the running belt 5 from more sensitively responding: if the error time is set more shortly, frequent emergent stops are generated. That is, in case that the movement distance in a direction during reciprocating movement of the running belt 5 is 30cm and 50cm, respectively, and the respective reaching time in one direction is determined in accordance with the speed and the reaching time is summed with the redundant time to thereby set the error time. The redundant time in case of 50cm is long-set compared with the case of 30cm.

[37] Also, the actuation pattern of the running belt 5, that is, various reciprocating length, reciprocating times and reciprocating speed can be used by user with his direct input or used selectively by the user in accordance with the program set in advance with various combinations. An input device for user can be used by installing it on the scale plate 4 and by conventional manipulation on the scale plate 4, if selectable.

[38] The running machine 100 according to the present invention allows the running belt 5 to perform various exercises including a stretching exercise and muscular power exercise with the reciprocating movement by the method and structure described above. Herein, in order to effectively perform a stretching or muscular power exercise when performing it, a subsidiary base 7 may be coupled to the end or positioned adjacent to the side of the lower frame 1 in which the support frame 2 in the running machine 100 is not installed, and a subsidiary handle 22 may be detachably installed on an appropriate portion such as the support frame 2 or the subsidiary frame 21 installed on the support frame 2.

[39] As shown in Figure 1, a coupling hole 20 is formed on both sides of the end of the lower frame 1, a coupling pin 15 is formed on the end of the rope or chain coupled to the both sides of the subsidiary base 7 and the coupling pin 15 is fixedly inserted into the coupling hole. Resultantly, the subsidiary base 7 can be used integrally with the lower frame 1 to thereby have the stability.

[40] Various structures other than the coupling structure described above may be implemented. A pad for preventing only a slipping without having the structure of coupling hole 20 and coupling pin 15 may be attached to the lower surface of the subsidiary base 7. The scheme for fixing the subsidiary base 7 is not limited only to the above example and can employ any schemes allowing the subsidiary base 7 to maintain a predetermined distance with the lower frame 1 during the exercise.

[41] Because the subsidiary base 7 installed adjacent to the rotatably moving running belt 5 is fixed at its place, a leg stretching exercise can be performed by putting respective leg on the subsidiary base 7 and the running belt 5 and then reciprocately moving the running belt 5 within the scope of a predetermined distance. A muscular power exercise of shoulder and abdominal muscles can be performed by putting knees

on the subsidiary base 7, putting arms on the running belt 5 and reciprocately moving the running belt 5 within the scope of a predetermined distance. Herein, a soft composite resin or textile may be attached to the upper surface of the subsidiary base 7.

[42] And, the subsidiary handle 22 is detachably attached to the support frame 2: the subsidiary handle 22 may be attached directly to the support frame 2 or coupled to the center of the subsidiary handle coupled detachably to the support frame as shown in Figure 1. The subsidiary frame 21 may be used as a handle. User in the running machine 100 can grip the subsidiary handle 22 and thus stably maintain his upper body when stretching both knees and waist as shown in Figure 6.

[43] The subsidiary handle 22 is preferably a long rope shape as shown in Figure 1 and its end is preferably branched into two pieces so that both hands can grip the pieces, respectively.

[44] As such, by making the subsidiary handle 22 a rope shape, it is possible to appropriately change the grip position in accordance with exercises and thus it can be used stably and conveniently.

[45] Further, according to the present invention, the effect of exercise can be maximized by allowing the actuation pattern of the running belt 5 to have the following steps: the step of moving the running belt 5 in a predetermined distance; the step of having an stopping period to stop the running belt 5; and the step of releasing the running belt 5 by moving it at a predetermined distance in the same direction. Thus, in case that the leg or arm is putted on the running belt 5 and the subsidiary base 7, respectively, the widened state is maintained at a predetermined time and then allowed it to be further widened at a predetermined distance to thereby have the release effect.

[46] Also, by making the speed of any one side slow or fast with maintaining the distance during forwarding and reversing rotations, it can hold various stress-mitigating capabilities capable of promptly mitigating the limiting point that the body of user is able to bear.

[47] As an example of exercise, when being slowly pressed in a unbearable distance with an exercise attitude of a commercial product called as "AB slider", if the running belt 5 slowly comes at the speed that the running belt 5 goes, user may fall without keeping his weight and thus in order to prevent it, the coming speed of running belt 5 is applied fast. This movement is also applied to a leg stretching or other attitudes.

[48]

### **Brief Description of the Drawings**

[49] Fig. 1 is a perspective view of multi-functional running machine according to the present invention;

[50] Fig. 2 is a detailed view of a driving section of the running machine;



- [51] Fig. 3 is a view illustrating a stretching exercise of leg using the running machine;
- [52] Fig. 4 is a view illustrating a muscular power exercise of shoulder and abdominal muscles using the running machine;
- [53] Fig. 5 is a view illustrating a stretching exercise of the side using the running machine;
- [54] Fig. 6 is a view illustrating a stretching exercise of both knees and waist using the running machine;
- [55] Fig. 7 is a view illustrating a muscular power exercise of the chest using the running machine;
- [56] Fig. 8 is a view illustrating a stretching exercise of the side and a muscular power exercise of abdominal muscles using the running machine;
- [57] Fig. 9 is a view illustrating a stretching exercise of the waist and legs using the running machine;
- [58] Fig. 10 is a view illustrating various actuating patterns of the running belt; and
- [59] Fig. 11 is a view illustrating various embodiments of the subsidiary handle.
- [60]

### **Best Mode for Carrying Out the Invention**

- [61] Now, exercises using the running machine 100 of the present invention will be described in detail.
- [62] Firstly, Figure 3 shows a leg stretching exercise. One leg is putted on the subsidiary base 7 fixed without the movement and another leg is putted on the running belt 5 being moved. Then the running belt 5 is reciprocately moved in both directions at the speed and distance without causing immoderation on the leg and thus the leg stretching exercise can be performed with the gap between both legs being widened and narrowed.
- [63] Of course, if the running belt 5 is maintained during a predetermined time after the transfer by a predetermined distance, the leg is maintained at the widened state resulting in the maximized effect of its stretching and thereafter if it is transferred in the same direction, the leg is further widened, resulting in the achievement of the release effect.
- [64] And, in this case as well as all other exercises, if the running belt 5 is continuously transferred in the same direction, the transfer of the running belt 5 can be stopped by automatically breaking a power supply.
- [65] Figure 4 shows a muscular power exercise of shoulder and abdominal muscles. Two legs and a knee are putted on the subsidiary base 7 fixed without the movement and two hands are uniformly putted on the running belt 5 being moved. Then, the running belt 5 is reciprocately moved in both directions at the speed and distance without

causing immoderation on the leg and the stress and release of the abdominal muscles are repeated. Therefore, the muscular power exercise of the abdominal muscles against the gravity can be performed.

[66] Herein, when two hands uniformly putted on the running belt 5, the pad is firstly putted on the running belt 5 and then two hands are putted to thereby protect sanitarilly user's hand on the running belt 5.

[67] Figure 5 shows a stretching exercise of the side. The handle 3 attached to the support frame 2 is gripped so as to maintain the body and user uprightly stands with two foots uniformly concentrated on the running belt 5. Then, the running belt 5 is reciprocately moved in both directions at the speed and distance without causing immoderation on the body and the stress and release of the side muscles are repeated with the left and right movement of two legs in the same direction. Therefore, a stretching exercise of the side can be performed.

[68] Figure 6 shows a stretching exercise of both knees and waist. User sits on the running belt 5 of the lower frame 1 with two legs being stretched and then grips the subsidiary handle 22 coupled to the subsidiary frame 21 of the support frame 2.

[69] After maintaining the above attitude, the running belt 5 is reciprocately moved in both directions at the speed and distance without causing immoderation on the body and thus user's upper body fixed by the subsidiary handle 22 is bent and then stretched. Therefore, a stretching exercise of waist can be performed.

[70] Herein, the subsidiary handle 22 is used as that made of a rope or a resilient band having high resilient coefficient to thereby make the displacement due to acting power weak. This is to avoid the problems that if the displacement of the subsidiary handle 22 becomes large during exercise, the user's stability in position is not well maintained and if the subsidiary handle 22 has no its resilient nature, an immoderation is applied to the user's body when the running belt 5 is rotated to only one side due to an abrupt malfunction.

[71] Figure 7 shows a muscular power exercise of the chest. That is, the user puts two hands on the subsidiary base 7 and the pad 16 of the running belt 5, respectively and the running belt 5 is reciprocately moved. Then, the stretching or concentrating of two arms is repeated. Therefore, the muscular power exercise of the chest can be performed. Figure 8 shows a stretching exercise of the side and a muscular power exercise of abdominal muscles. The subsidiary base 7 is positioned on the side of the lower frame 1. That is, user puts two knees on the subsidiary base 7 and puts two arms on the running belt 5 to be widened at a predetermined distance. Then, the side is stretched in accordance with the reciprocating movement of the running belt 5 and at the same time, the muscular exercise is performed

[72] Figure 9 shows a stretching exercise of the waist and legs. User performs the

exercise with his back against the running belt 5. That is, user lies with his head putted toward the scale plate 4 and puts legs on the subsidiary handle 22. And then, the waist and legs are repeatedly stressed to perform a stretching and then released in accordance with the moving direction of the running belt 5.

- [73] When performing the exercise as shown in Figure 9, the embodiment of the subsidiary handle 22 shown in Figure 11 can be more useful compared with the embodiment of the subsidiary handle 22 shown in Figure 1.
- [74] That is, the subsidiary handle can variously be implemented: the subsidiary handle 22 shown in Figures 1 and 11 is branched at its one end into two pieces and is fixed at its other end to the subsidiary frame 21. In order to be coupled easily and detachably to the subsidiary frame 21, the subsidiary frame 21 may be installed with a coupling hole formed with a coupling aperture and the other end of the subsidiary frame 22 may be formed with a coupling ring 28.
- [75] And, other embodiment of the subsidiary handle is the same as shown in Figures 9 and 11, wherein a coupling ring 28 of a long rope shape is both ends of the subsidiary handle. Two coupling holes are required in order to install it on the subsidiary frame 21.
- [76] Such various subsidiary handles 22 and 22' can selectively be installed in accordance with the type of the movement thereof and thus it is possible to perform the very convenient, safe and effective movement.
- [77] When the movement of running belt 5 needs to be stopped due to decrease of physical power or an abrupt situation in the course of performing the above respective exercise, stopping the running belt 5 by actuating a switch installed on the scale plate 4 causes inconveniency and is dangerous during exercise and thus a safe switch 17 is installed on the one side of the lower frame 1 in order to stop the running belt 5 simply and safely. Accordingly, user can stop the running belt 15 by actuating the safe switch 17 with a simple bent of his body during a stretching exercise.
- [78] The present invention can provide various acting patterns of the running belt 5. Although one embodiment among them was mentioned above, other embodiments of various acting patterns of the running belt 5 are shown through (a) to (f) in Figure 10. In Figure 10, the starting and arriving points, that is, the points of both ends of the reciprocating movement are indicated as A and Z, and specific points in the reciprocating movement area are indicated as A', B', etc. by adding thereto
- [79] All acting patterns shown in Figure 10 can be applied to all exercises shown in Figures 3 through 8.
- [80] Figure 10(a) shows the most basic acting pattern which is a pattern reciprocating between the starting point A and arriving point Z at the same time interval.
- [81] Figure 10(b) shows that the running belt 5 is reciprocately moved between the point

A and the point Z, in which the speed of the running belt 5 when it moves from A to Z is more slowly actuated than when it moves in the opposite direction thereto. Of course, the running belt 5 can be actuated in the opposite direction thereto.

[82] Figure 10(c) shows that while the running belt 5 is reciprocately moving at a short distance, it reciprocately moves to A and Z which is all reciprocating distance and then it reciprocately moves at a short distance again and returns to the point A.

[83] That is, the running belt 5 reciprocately moves at a short distance from the starting point A to A' moves to the point Z after reciprocately moving from A to B', reciprocately moves at a short distance from Z to C', reciprocately moves short distance to D after moving to the and then moves to Z.

[84] The above AA', AB', AD' and C'Z may be equal to or different from each other in distance. The distance can be selected depending upon various patterns of exercises.

[85] Figure 10(d) shows a pattern of the state that the running belt 5 is stopped during a predetermined time in the middle point from A to Z. That is, the running belt 5 has a stopping period for several seconds after moving from A to A' and has a stopping period again after moving to B' and then moves to Z. When returning, it moves to just A. The pattern is also only one embodiment, there may be one or two more stopping points in the route from A to Z and there may be a stopping point in the route returning from Z to A.

[86] Figure 10(e) is one example that the running belt 5 is reciprocately moved at a short distance in the route from A to Z. That is, Figure 10(e) shows a pattern of the state that the running belt 5 is forwardly moved to A' and then reversely moved to B', and again the running belt 5 is forwardly moved to C' and then reversely moved to D', and thereafter the running belt 5 is forwardly moved to E' and then reversely moved to F'. And then, the running belt 5 is forwardly moved to Z and then reversely returned to A.

[87] Of course, in this case, the number of the short reciprocating periods may be freely set and its length may also be set appropriately.

[88] Figure 10(f) shows a pattern that overall reciprocating movement and a short reciprocating movement are made alternately. That is, after the reciprocating movement of the short period of AA', the reciprocating movement of AZ is made and again after the reciprocating movement of AB', the reciprocating movement of AZ is made. Of course, in this case, the length of AA' and AB' may be equal to or different from each other.

[89] Various exercises as described above can be implemented by the present invention and user performing his exercise on the running belt 5 being reciprocately moved can control pressing or releasing his body by moving a little by little on the running belt 5 without separately operating the scale plate 4 during exercise and so on. Therefore, aspects capable of using the running belt are various and thus the variability and

convenience of exercise can be provided for user.

[90]

### **Industrial Applicability**

[91] As such, the present invention can control the reciprocating times, reciprocating distance and reciprocating speed of the running belt 5 in accordance with actuation information of motor 13 detected by the sensor 9 and exercise information selected by user to thereby allow the bi-directional movement to be possible. Accordingly, user can perform various exercises including various stretching exercises in addition to walking and running exercises using the running machine of the present invention.

[92]

[93]

[94]